Effect of Using Concept Maps on Performance Level in Practical Education in Light of Comprehensive Quality Standards

Abdallah Abdel-Halim Mohammed Aly

Department of Teaching Methods, Training and Practical Education, Faculty of Physical Education, Minoufiya University, Egypt

Abstract: This study aimed to identify the effect of concept maps strategy on cognitive acquisition level and teaching skills performance in light of comprehensive quality standards. This study was carried on sample of 100 students in third grade, Faculty of Physical Education, Menoufiya University in 2010/2011. The researcher used the experimental method using the experimental design for two groups: the experimental group used concept maps strategy during teaching (n=50). The traditional group (control group) used the traditional method in teaching (n=50) with pre and post measurements to both two groups. The experimental work was carried out through 12 weeks, twice a week for 90 minutes (unit time). The results of statistical analysis referred that concept maps strategy has more effective and positive influence on learning comparing with the traditional method in teaching. It is recommended to use concept maps strategy during learning or teaching. It has a positive effect on cognitive acquisition level and teaching skills performance under research.

Key words: Concept maps %Practical education %Comprehensive quality %Cognitive acquisition %Teaching skills

INTRODUCTION

Nowadays, we live the globalization and knowledge explosion age that resulted in the appearance of new teaching methods. Other technologies and strategies that we cannot expect now will appear soon [1]. Educators face difficult challenges, particularly with regard to the preparation curriculums and its application. There is a huge amount of scientific knowledge of existing curriculums, Curriculums content, lack of coherence and organization negatively affects the extent of benefit from it to reach the desired purposes [2].

A concept map is a way of representing relationships between ideas, images or words. In a concept map, each word or phrase is connected to another and linked back to the original idea, word or phrase. Concept maps are a way to develop logical thinking and study skills by revealing connections and helping students to see how individual ideas form a larger whole [3].

The technique of concept mapping was developed by Novak [4] and his research team at Cornell University as a mean of representing the emerging science knowledge of students. It has subsequently been used as a tool to increase meaningful learning in the sciences and other subjects as well as to represent the expert knowledge of individuals and teams in education, government and business. Concept maps have their origin in the learning movement called constructivism. In particular, constructivists hold that learners actively construct knowledge [5, 6]. A concept map is a diagram showing the relationships among concepts. It is a graphical tool for organizing and representing knowledge. Concepts usually represented as boxes or circles are connected with labeled arrows in a downward-branching hierarchical structure [7]. Researcher used the concept maps strategy with great efforts aimed to use the modern technologies and employing them in education field. The current thoughts desire, according to these technologies, to propose the educational material according to the modern philosophies [8, 9].

Hence, the idea of this research that aimed to use concept maps strategy to know its effect on cognitive acquisition level and teaching skills performance in light of comprehensive quality standards.
MATERIALS AND METHODS

Validity: Internal consistency between the phrases and axis were at the 0.05 level of the pilot study in the determined measurements under research (cognitive acquisition test and teaching skills form). Range correlation between 0.597: 0.956 (value of spreadsheet at the level of significance 0.05 = 0.514) shows the validity of both cognitive acquisition test and teaching skills form.

Reliability: Reliability coefficient was calculated by using Spearman-Brown formula split half method between individual and dual phrases. The values ranged between 0.593 and 0.879 (the value of spreadsheet at the level of significance 0.05 = 0.514) which shows the reliability of both cognitive acquisition test and teaching skills form of the pilot study.

Research Sample: This study has been carried out on a sample of 100 students of third grade in the Faculty of Physical Education, Menoufiya University for the academic year 2010/2011.

The sample has been divided into two groups. The first group (experimental group) used concept maps strategy during teaching (N=50), the second group (control or traditional group) used the traditional method in teaching (N=50). Cognitive acquisition test and teaching skills form have been used. The work was performed through 12 weeks, twice a week and the teaching unit was 90 minutes.

Application and Implementation

The Experimental Group (First Group): Teaching by concept maps strategy from data show for 90 minutes.

The Control Group (Second Group): Teaching by traditional method for 90 minutes.

Evaluation Forms: Cognitive test [10] and teaching skills form [11] had been used to know the level of both cognitive acquisition level and teaching skills performance in light of comprehensive quality standards. The curriculum’s content for students of third year was analyzed [10] to determine the teaching skills in Practical Education.

Measurements of the Baseline Study Sample

Homogeneity: Table 1 shows the matching of the research sample in variables: age, cognitive acquisition and teaching skills.

Parity: Table 2 shows the parity between two groups (experimental group and control group) by using t-test in variables: age, cognitive acquisition and teaching skills.

Statistical Analysis: The Statistical Package for the Social Science (SPSS / PC) was used for statistical analysis using: Mean, Std. Deviation (± SD), Median, Skewness and Correlation coefficient. Comparisons between initial (pre) and final (post) measurements in each group were analyzed by t test.

RESULTS AND DISCUSSION

Table 3 shows the presence of significant statistical differences between the average initial (pre) and final (post) measurement for the two groups in the cognitive acquisition test and teaching skills, for the average of final (post) measurement of the research sample.

Table 1: Mean, median, std. deviation and skewness of variables (age, cognitive acquisition and teaching skills)

<table>
<thead>
<tr>
<th>Variables</th>
<th>mean</th>
<th>median</th>
<th>±SD</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>19.054</td>
<td>19.000</td>
<td>1.321</td>
<td>1.226</td>
</tr>
<tr>
<td>Cognitive acquisition (Score)</td>
<td>3.325</td>
<td>3.200</td>
<td>0.849</td>
<td>0.442</td>
</tr>
<tr>
<td>Teaching skills (Score)</td>
<td>3.928</td>
<td>3.740</td>
<td>1.332</td>
<td>0.423</td>
</tr>
</tbody>
</table>

Table 2: t-test between the two groups (experimental group and control group) in the measurements tribal research

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>Mean</th>
<th>SD±</th>
<th>Mean</th>
<th>±SD</th>
<th>T. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group N=50</td>
<td>18.990</td>
<td>0.972</td>
<td>19.118</td>
<td>0.885</td>
<td>0.074</td>
</tr>
<tr>
<td>Control group N=50</td>
<td>3.219</td>
<td>0.743</td>
<td>3.431</td>
<td>0.742</td>
<td>0.544</td>
</tr>
<tr>
<td></td>
<td>3.795</td>
<td>1.121</td>
<td>4.061</td>
<td>1.487</td>
<td>0.457</td>
</tr>
</tbody>
</table>

Value of “t” spreadsheet at the level of significance 0.05 = 1.99 (2 groups, 2 tailed)
### Table 3: T-test of the two research groups (experimental group and control group)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>N</th>
<th>Mean ±SD</th>
<th>mean ±SD</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>cognitive acquisition (Score)</td>
<td>Experimental group</td>
<td>50</td>
<td>3.219 ±0.743</td>
<td>7.214 ±1.240</td>
<td>9.245*</td>
</tr>
<tr>
<td>teaching skills (Score)</td>
<td>Control group</td>
<td>50</td>
<td>3.431 ±0.742</td>
<td>6.024 ±1.546</td>
<td>9.547*</td>
</tr>
</tbody>
</table>

Value of “t” spreadsheet at the level of significance 0.05 = 2.011 (one group, 2-tailed) * shows significant at 0.05 level

### Table 4: T-test to two research groups (experimental and traditional groups) in final (post) measurements

<table>
<thead>
<tr>
<th>Groups</th>
<th>Experimental group N=50</th>
<th>Control group N=50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Measurement</td>
<td>Mean ±SD</td>
</tr>
<tr>
<td>Cognitive acquisition (Score)</td>
<td>Final (post) measurement</td>
<td>7.214 ±1.240</td>
</tr>
<tr>
<td>teaching skills (Score)</td>
<td>Final (post) measurement</td>
<td>7.874 ±1.687</td>
</tr>
</tbody>
</table>

Value of “t” spreadsheet at the level of significance 0.05 = 1.66 (2 groups, one-tailed)
* shows significant at 0.05 level

**Average Pre-post Measurements of Control Group in Favor of Post Measurements:** Results showed improving in the teaching skills implementation and cognitive acquisition level in this group. This was because of depending on traditional method in teaching with the continuous feedback by teacher and developing the students consequently with feedback that help in building and developing their skillful imagination [12].

**Average Pre-post Measurements of Experimental Group (Concept Maps Group) in Favor of Post Measurements Average:** Results showed improving in the teaching skills implementation and cognitive acquisition level in this group because of depending on concept maps strategy that lead to improvement and progress in Acquiring information and knowledge associated with teaching skills (cognitive acquisition) and improve in performance level of teaching skills. Consequently, there were positive effects on cognitive acquisition and teaching skills performance for the research sample.

This agree with Hayward [13] who pointed to that using the technologies (as in concept maps strategy) helped in evaluating and presenting the material well in comparing to scientific material that be presented in other forms. Besides, providing the feedback for right implementation help students to understand these skills and achieve the best implementation. This progress returned to the amount of information which students have form the similar types of concept maps, beside illustrations diagrams.

Table 4 shows the presence of significant statistical differences in the average final (post) measurement between the two groups in the determined Variables under research. And improve in average final (post) measurement for the experimental group (concept maps group).

Table 4 refers that there were statistical differences at level (0.05) between the two groups (experimental group and control or traditional group) in final (post) measurements in favor of the experimental group (concept maps group). This progress resulted from depending on concept maps strategy, illustrated diagrams through data show. This proves that concept maps strategy is better than traditional method in teaching. So, there were differences in statistical data between the two groups in favor of the experimental group (concept maps group).

### CONCLUSION

C Concept maps strategy has a positive effect on cognitive acquisition level and teaching skills performance.

C Traditional method in teaching has a positive effect on cognitive acquisition level and teaching skills performance.

C Concept maps strategy has more effective and positive influence on cognitive acquisition level and teaching skills performance comparing with the traditional method in teaching.

### RECOMMENDATION

C Using concept maps strategy in education process because of it positive effect on cognitive acquisition level and teaching skills performance.
Implementing researches and similar studies on different materials by using Concept maps strategy and recognition the best methods that improve the level of teaching skills in Practical Education.

REFERENCES